Claims

1. A method for reducing the susceptibility of fish to infection by a virulent strain of the bacterial pathogen *Aeromonas salmonicida* comprising the administration, either intraperitoneally, intramuscularly, intradermally, intracellularly, by spraying, by immersion, or orally, or by any combination of routes, to said fish an immunogenic amount of a pharmaceutical composition comprising at least one epitope or epitopic region of AcrV, or of any other protein of the *A. salmonicida* Type III secretion apparatus, or of their natural or genetically modified variants, or antigenic peptides derived or synthesized thereof, with or without an adjuvant.

2. The method of Claim 1, wherein the epitope or epitopic region of AcrV, or of any other protein of the *A. salmonicida* Type III secretion apparatus, or of their natural or genetically modified variants, or antigenic peptides derived or synthesized thereof, is fused to at least one other protein or protein fragment at either the N'- or C'-terminal, or both, and wherein the said at least one other protein fragment facilitates expression or the formation of insoluble intracellular aggregates.

3. The method of Claim 1, wherein the epitope or epitopic region of AcrV, or of any other protein of the *A. salmonicida* Type III secretion apparatus, or of their natural or genetically modified variants, or antigenic peptides derived or synthesized thereof, is fused to at least one other protein or protein fragment at either the N'- or C'-terminal, or both, and wherein the said at least one other protein or protein fragment is a T cell epitope or a B cell epitope.

4. A method as in any one of Claims 1 – 3, wherein the pharmaceutical composition is encapsulated or absorbed to an insoluble matrix.

5. A method as in any one of Claims 1 – 3, wherein the sequence of the epitope or epitopic region of AcrV, or of any other protein of the *A. salmonicida* Type III secretion apparatus, or of their natural or genetically modified variants, or antigenic peptides derived or synthesized thereof, is optimised for expression in a suitable expression host microorganism.

6. A method for reducing the susceptibility of fish to infection by a virulent strain of *A. salmonicida* comprising the administration, either intraperitoneally, intramuscularly, intradermally, intracellularly, by spraying, by immersion, or orally, or by any combination

of routes, to said fish an immunogenic amount of a pharmaceutical composition comprising the *acrV* gene, or that of any other protein of the *A. salmonicida* Type III secretion apparatus, or homologues, fragments, or synthetic oligonucleotides derived thereof.

7. An immunological method for the detection of humoral antibody to AcrV or any other protein of the *A. salmonicida* Type III secretion apparatus in sera or tissues of fish wherein the Type III secretion apparatus protein, or a fragment thereof, or natural or genetically modified variant thereof, or peptide derived or synthesized thereof, is used to absorb or bind to fish immunoglobulins from fish sera or tissues.

8. A method whereby the plasmid-based expression vectors described herein or produced by any other means are used to express AcrV or any of the other proteins of the *A. salmonicida* Type III secretion apparatus, their variants or fragments thereof, or synthesized peptides thereof, are expressed with T and/or B cell epitopes.

9. A method for the detection of the presence of the genes of AcrD, AcrV or any other components of the *A. salmonicida* Type III secretion apparatus or a method for the detection of the presence of the AcrD, AcrV proteins or any other proteins of the *A. salmonicida* Type III secretion apparatus used for the production or quality control or efficacy of vaccines made from *A. salmonicida* or its genes.

10. The use of the *A. salmonicida* Type III secretion apparatus to produce selected products.

11. The use defined in Claim 10, wherein the product is AexT.

12. A therapeutic method for the protection of fish from the toxic effect of a virulent strain of *A. salmonicida* comprising the use of antiserum directed against recombinant AcrV.

13. An isolated protein selected from the class comprising SEQ ID NO:1; SEQ ID NO:2; SEQ ID NO:3; SEQ ID NO:4; SEQ ID NO:5; SEQ ID NO:6; SEQ ID NO:7; SEQ ID NO:8; and SEQ ID NO:9.

14. An isolated polypeptide comprising at least one epitope or epitopic region of a selected one of the class Acr1; Acr2; Acr3; Acr4; AcrD; AcrR; AcrG; AcrV; and AcrH.

15. An isolated nucleic acid fragment encoding a protein having an amino acid sequence as given in a selected one of the class comprising SEQ ID NO:1; SEQ ID NO:2; SEQ ID NO:3; SEQ ID NO:4; SEQ ID NO:5; SEQ ID NO:6; SEQ ID NO:7; SEQ ID NO:8; and

SEQ ID NO:9, encompassing amino acid substitutions, additions and deletions that do not alter one of the immunogenicity and the function of said proteins.

16. An isolated nucleic acid fragment comprising SEQ ID NO:10.

17. An isolated nucleic acid fragment comprising the contiguous sequence of SEQ ID No:10, or the full length complement thereof.

18. An immunogenic, immunological or vaccine composition comprising a protein or polypeptide as claimed in one of Claims 13 and 14.

19. The use of AcrV in a vaccine for reducing the susceptibility of fish to infection by a virulent strain of *A. salmonicida*.

20. A vaccine for reducing the susceptibility of a fish to infection by a virulent strain of *A. salmonicida* comprising AcrV.

21. An immunogenic, immunological or vaccine composition comprising a nucleic acid fragment of Claim 16.

22. Use of AcrV or the DNA encoding the gene for AcrV as well as those DNA regions flanking that gene of *A. salmonicida* in the manufacture of a diagnostic agent.